

AMENDMENTS TO THE SPECIFICATION

Delete the original pages containing Tables 1-23.

Insert between page 38 and page 39 the following pages including Tables 1-23.

Table 1

(Unit: Percent by mass)

Name of material	Quality	C	Si	Mn	P	S	Cu	Ni	Cr
Mild steel	A	0.036	<0.01	0.20	0.012	0.007	0.013	0.014	0.020
	B	0.010	<0.01	0.25	0.006	0.004	0.011	0.012	0.019
Cr-Mo alloy steel	C	0.025	0.50	1.14	0.003	0.007	0.012	0.084	1.39
	D	0.031	0.48	1.10	0.007	0.005	0.013	0.031	2.44

Table 2

(Unit: Percent by mass)

Name of material	Quality	Mo	Al	Ti	Nb	V	B	N	Mg
Mild steel	A	0.005	0.038	<0.002	0.003	<0.002	<0.0002	0.0024	<0.002
	B	0.002	0.008	<0.002	0.003	<0.002	<0.0002	0.0033	<0.002
Cr-Mo alloy steel	C	0.48	0.004	0.002	0.003	0.003	<0.0002	0.0080	<0.002
	D	1.10	0.002	<0.002	0.003	0.004	<0.0002	0.0090	<0.002

Table 3

Wire No.	Comparative example 1	Comparative example 2	Comparative example 3	Comparative example 4	Comparative example 5	Comparative example 6	Comparative example 7	Comparative example 8
Sheath quality	B	B	B	B	B	B	B	B
Flux ratio (% by mass)	17.0	17.0	17.0	14.0	14.0	16.0	16.0	16.0
Slag-forming material content (% by mass)	8.228	8.228	8.228	6.776	6.776	7.696	7.744	7.760
Composition (% by mass)	C	0.218	0.039	0.040	0.038	0.055	0.042	0.037
	Si	0.664	0.051	1.415	0.537	0.566	0.615	0.593
	Mn	1.451	1.381	1.387	0.541	1.623	1.369	1.373
	P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	S	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	Cu	0.009	0.010	0.009	0.010	0.010	0.009	0.009
	Ni	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.525	1.322	1.325	1.267	1.267	2.659	1.396
	Mo	0.503	0.502	0.502	0.413	0.413	0.953	0.292
	Al (Sheath, alloy powder)	0.011	0.007	0.033	0.011	0.011	0.011	0.011
	Al ₂ O ₃ (Equivalent Al content)	0.045	0.045	0.045	0.037	0.037	0.028	0.043
	Total	0.056	0.052	0.078	0.048	0.048	0.039	0.054
	Ti	0.001	0.001	0.003	0.001	0.001	0.001	0.001
	Nb (Sheath, alloy powder)	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₃ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Slag-forming material	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.004	0.004	0.004	0.003	0.003	0.003	0.003
	Total	0.005	0.005	0.005	0.004	0.004	0.004	0.004
	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.008	0.008	0.007	0.007	0.008	0.007
	Total	0.008	0.008	0.008	0.007	0.007	0.008	0.007
	N	0.014	0.015	0.015	0.013	0.013	0.014	0.014
	Mg	0.798	0.798	0.798	0.657	0.657	0.751	0.751
	Zr	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	7.320	7.320	7.320	6.028	6.028	6.889	6.889
	SiO ₂	0.386	0.386	0.386	0.318	0.318	0.255	0.363
	Al ₂ O ₃	0.085	0.085	0.085	0.070	0.070	0.052	0.080
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.0000	0.011
	MgO	0.000	0.000	0.000	0.000	0.000	0.156	0.000
	V ₂ O ₅	0.007	0.007	0.007	0.005	0.005	0.006	0.006
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.050	0.050	0.050	0.041	0.041	0.042	0.047
	K ₂ O	0.039	0.039	0.039	0.032	0.032	0.024	0.037
	CaO	0.000	0.000	0.000	0.000	0.000	0.002	0.000
	B ₂ O ₃	0.027	0.027	0.027	0.022	0.022	0.026	0.023
Fluoride compound	NaF	0.000	0.000	0.000	0.000	0.000	0.075	0.000
	K ₂ SiF ₆	0.304	0.304	0.304	0.250	0.250	0.080	0.286
	CeF ₃	0.000	0.000	0.000	0.000	0.000	0.066	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.016
Total (Equivalent F content)		0.157	0.157	0.157	0.130	0.130	0.094	0.148
Other elements		0.009	0.009	0.009	0.008	0.008	0.023	0.009
Total Ti/N		313	287	290	276	277	287	285
								287

Table 4

Wire No.	Comparative example 9	Comparative example 10	Comparative example 11	Comparative example 12	Comparative example 13	Comparative example 14	Comparative example 15
Sheath quality	B	B	B	B	B	B	B
Flux ratio (% by mass)	18.0	18.0	15.0	15.0	15.0	15.0	13.0
Slag-forming material content (% by mass)	8.334	8.712	6.795	7.245	6.795	6.495	7.072
Composition (% by mass)	C	0.046	0.051	0.044	0.044	0.044	0.040
	Si	0.670	0.459	0.383	0.383	0.383	0.329
	Mn	0.975	1.520	1.310	1.309	1.310	1.204
	P	0.007	0.007	0.007	0.007	0.008	0.007
	S	0.005	0.005	0.005	0.005	0.005	0.004
	Cu	0.010	0.009	0.010	0.010	0.010	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.568	1.623	1.356	1.356	1.356	1.157
	Mo	0.565	0.531	0.443	0.443	0.443	0.384
	Al (Sheath, alloy powder)	0.020	0.465	0.007	0.007	0.007	0.007
	Al ₂ O ₃ (Equivalent Al content)	0.490	0.048	0.040	0.047	0.040	0.039
	Total	0.510	0.513	0.047	0.054	0.047	0.046
	Ti	0.001	0.001	0.001	0.001	0.001	0.001
	Nb (Sheath, alloy powder)	0.002	0.002	0.016	0.009	0.002	0.002
Nb	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.001	0.008	0.001	0.010
	Total	0.002	0.002	0.017	0.017	0.003	0.012
	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.013	0.001
V	V ₂ O ₃ (Equivalent V content)	0.003	0.004	0.005	0.012	0.005	0.015
	Total	0.004	0.005	0.006	0.013	0.018	0.016
	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000
B	B ₂ O ₃ (Equivalent B content)	0.009	0.009	0.007	0.007	0.007	0.000
	Total	0.009	0.009	0.007	0.007	0.007	0.000
	N	0.016	0.016	0.014	0.014	0.014	0.010
Slag-forming material	Mg	0.845	0.845	0.704	0.599	0.704	0.704
	Zr	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	6.474	7.750	5.967	5.083	5.967	5.489
Fluoride compound	SiO ₂	0.457	0.409	0.849	1.558	0.349	0.401
	Al ₂ O ₃	0.927	0.090	0.075	0.088	0.075	0.073
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.000	0.000	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.006	0.007	0.008	0.021	0.008	0.026
	Nb ₂ O ₅	0.000	0.000	0.002	0.011	0.002	0.014
	Na ₂ O	0.059	0.053	0.044	0.044	0.044	0.044
	K ₂ O	0.047	0.041	0.035	0.036	0.035	0.028
	CaO	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.029	0.029	0.024	0.024	0.024	0.000
Other elements	NaF	0.000	0.000	0.000	0.000	0.000	0.000
	K ₂ SiF ₆	0.322	0.322	0.268	0.268	0.268	0.233
	CeF ₃	0.000	0.000	0.000	0.000	0.000	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.167	0.167	0.139	0.139	0.139	0.120
Other elements		0.013	0.010	0.023	0.112	0.023	0.119
Total Ti/N		244	293	259	221	259	238
							399

Table 5

Wire No.	Comparative example 16	Comparative example 17	Comparative example 18	Comparative example 19	Comparative example 20	Comparative example 21	Comparative example 22
Sheath quality	B	B	B	B	B	B	B
Flux ratio (% by mass)	13.0	13.0	13.0	13.0	15.0	15.5	14.0
Slag-forming material content (% by mass)	7.452	7.085	7.189	7.267	7.260	7.502	7.685
Composition (% by mass)	C	0.040	0.040	0.039	0.040	0.044	0.045
	Si	0.329	0.329	0.321	0.362	0.383	0.394
	Mn	1.203	1.204	1.166	1.165	1.056	1.080
	P	0.007	0.007	0.007	0.007	0.007	0.007
	S	0.004	0.004	0.005	0.005	0.005	0.005
	Cu	0.010	0.010	0.010	0.010	0.010	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.157	1.157	1.102	1.377	1.356	1.392
	Mo	0.384	0.384	0.384	0.384	0.443	0.457
	Al (Sheath, alloy powder)	0.007	0.010	0.007	0.007	0.007	0.007
Al	Al ₂ O ₃ (Equivalent Al content)	0.039	0.033	0.035	0.035	0.040	0.041
	Total	0.045	0.043	0.042	0.042	0.047	0.048
	Ti	0.001	0.001	0.001	0.001	0.001	0.001
Nb	Nb (Sheath, alloy powder)	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
V	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.003	0.003	0.003	0.003	0.003	0.002
	Total	0.004	0.004	0.004	0.004	0.004	0.003
B	B (Sheath, alloy powder)	0.000	0.022	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.022	0.001	0.005	0.006	0.007	0.008
	Total	0.022	0.023	0.006	0.006	0.007	0.008
	N	0.010	0.010	0.003	0.037	0.014	0.013
	Mg	1.169	1.169	0.519	0.519	0.180	1.517
Slag-forming material	Zr	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	6.494	6.494	6.494	6.494	6.459	6.674
	SiO ₂	0.439	0.241	0.296	0.296	0.341	0.352
	Al ₂ O ₃	0.074	0.062	0.066	0.066	0.075	0.078
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.000	0.000	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.008	0.006	0.006	0.006	0.006	0.004
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.101	0.015	0.039	0.039	0.044	0.046
	K ₂ O	0.035	0.028	0.030	0.030	0.035	0.036
	CaO	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.069	0.002	0.021	0.021	0.024	0.025
	NaF	0.000	0.000	0.000	0.000	0.000	0.000
	K ₂ SiF ₆	0.233	0.233	0.233	0.233	0.268	0.277
Fluoride compound	CeF ₃	0.000	0.000	0.000	0.032	0.000	0.000
	CaF ₂	0.000	0.000	0.000	0.038	0.000	0.000
	Total (Equivalent F content)	0.120	0.120	0.120	0.148	0.139	0.144
	Other elements	0.012	0.004	0.006	0.013	0.008	0.008
	Total Ti/N	400	399	1326	105	280	306
							166

Table 6

Wire No.	Comparative example 23	Comparative example 24	Comparative example 25	Comparative example 26	Comparative example 27	Comparative example 28	Comparative example 29
Sheath quality	B	B	B	B	B	B	B
Flux ratio (% by mass)	14.0	13.0	16.0	16.0	14.0	18.0	14.0
Slag-forming material content (% by mass)	9.002	7.644	8.848	7.744	6.874	8.694	8.035
Composition (% by mass)	C	0.034	0.040	0.046	0.047	0.042	0.047
	Si	0.367	0.332	0.395	0.049	0.360	0.325
	Mn	1.230	1.165	1.266	0.502	1.140	1.033
	P	0.006	0.007	0.007	0.006	0.007	0.007
	S	0.005	0.004	0.005	0.005	0.005	0.004
	Cu	0.010	0.010	0.010	0.010	0.010	0.010
	Ni	0.010	0.010	0.010	0.010	0.010	0.010
	Cr	1.356	1.178	1.396	1.378	1.281	1.153
	Mo	0.413	0.384	0.472	0.472	0.413	0.531
	Al (Sheath, alloy powder)	0.013	0.007	0.007	0.007	0.007	0.465
	Al ₂ O ₃ (Equivalent Al content)	0.029	0.035	0.042	0.043	0.132	0.048
	Total	0.042	0.042	0.049	0.050	0.139	0.513
	Ti	0.001	0.001	0.001	0.001	0.001	0.001
	Nb (Sheath, alloy powder)	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
	V (Sheath, alloy powder)	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.004	0.004	0.004	0.003	0.002	0.004
	Total	0.005	0.005	0.005	0.004	0.003	0.005
	B (Sheath, alloy powder)	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.006	0.007	0.008	0.008	0.023
	Total	0.008	0.006	0.007	0.008	0.008	0.023
Slag-forming material	N	0.013	0.012	0.014	0.014	0.015	0.038
	Mg	0.559	0.610	0.639	0.799	0.657	0.845
	Zr	0.000	0.000	0.000	0.000	0.000	0.000
	TiO ₂	8.322	7.143	7.193	6.889	4.126	7.750
	SiO ₂	0.271	0.289	0.355	0.363	1.042	0.399
	Al ₂ O ₃	0.055	0.065	0.080	0.080	0.249	0.090
	ZrO ₂	0.000	0.000	0.000	0.000	0.000	0.000
	MgO	0.000	0.000	0.000	0.000	0.000	0.000
	V ₂ O ₅	0.007	0.006	0.006	0.005	0.004	0.007
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.046	0.036	0.044	0.047	0.103	0.049
	K ₂ O	0.019	0.030	0.037	0.037	0.085	0.041
	CaO	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃	0.025	0.019	0.023	0.026	0.025	0.026
	NaF	0.000	0.000	0.000	0.000	0.606	0.000
	K ₂ SiF ₆	0.250	0.039	1.097	0.286	0.557	0.322
	CeF ₃	0.000	0.011	0.000	0.000	0.000	0.000
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.130	0.023	0.568	0.148	0.562	0.167
	Other elements	0.006	0.007	0.013	0.009	0.078	0.009
	Total Ti/N	384	348	298	305	166	121
							111

Table 7

Wire No.	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
Sheath quality	A	B	B	B	B	B	B
Flux ratio (% by mass)	15.0	15.0	15.0	18.0	18.0	13.0	14.0
Slag-forming material content (% by mass)	7.260	7.260	7.245	8.910	8.910	6.565	7.140
Composition (% by mass)	C	0.170	0.035	0.037	0.044	0.043	0.035
	Si	0.487	0.073	0.841	0.417	0.271	0.357
	Mn	0.640	1.217	0.817	0.569	1.573	1.008
	P	0.012	0.006	0.007	0.007	0.007	0.006
	S	0.007	0.005	0.005	0.005	0.005	0.005
	Cu	0.011	0.010	0.010	0.010	0.010	0.010
	Ni	0.012	0.010	0.010	0.010	0.010	0.010
	Cr	1.125	1.293	1.294	1.548	1.548	2.524
	Mo	0.380	0.443	0.443	0.531	0.531	0.978
	Al	0.033	0.007	0.022	0.007	0.007	0.008
	Al ₂ O ₃ (Equivalent Al content)	0.040	0.040	0.040	0.048	0.048	0.035
	Total	0.073	0.047	0.062	0.035	0.055	0.043
	Ti	0.001	0.001	0.002	0.001	0.001	0.001
	Nb	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.008	0.003	0.003	0.004	0.004	0.003
	Total	0.004	0.004	0.004	0.005	0.005	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.007	0.007	0.007	0.009	0.009	0.007
	Total	0.007	0.007	0.007	0.009	0.009	0.007
Slag-forming material	N	0.012	0.013	0.013	0.015	0.015	0.011
	Mg	0.599	0.599	0.599	0.719	0.719	0.519
	Zr	0.109	0.033	0.033	0.261	0.163	0.118
	TiO ₂	6.459	6.459	5.994	7.553	7.553	5.455
	SiO ₂	0.341	0.341	0.341	0.467	0.467	0.301
	Al ₂ O ₃	0.075	0.075	0.075	0.090	0.090	0.066
	ZrO ₂	0.000	0.000	0.000	0.299	0.299	0.129
	MgO	0.000	0.000	0.000	0.000	0.000	0.250
	V ₂ O ₅	0.005	0.006	0.005	0.007	0.007	0.005
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.044	0.044	0.044	0.053	0.053	0.039
	K ₂ O	0.035	0.035	0.035	0.041	0.041	0.030
	CaO	0.000	0.000	0.000	0.000	0.000	0.003
	B ₂ O ₃	0.024	0.024	0.024	0.029	0.029	0.022
Fluoride compound	NaF	0.000	0.000	0.141	0.169	0.169	0.122
	K ₂ SiF ₆	0.268	0.268	0.119	0.143	0.143	0.103
	CeF ₃	0.000	0.000	0.374	0.000	0.000	0.058
	CaF ₂	0.000	0.000	0.000	0.035	0.035	0.025
	Total (Equivalent F content)	0.139	0.139	0.234	0.168	0.168	0.121
	Other elements	0.008	0.008	0.093	0.022	0.022	0.016
	Total Ti/N	320	301	281	306	307	286
							234

Table 8

Wire No.	Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14
Sheath quality	A	B	B	B	B	B	B
Flux ratio (% by mass)	17.0	16.0	16.0	13.0	15.5	15.5	15.5
Slag-forming material content (% by mass)	8.636	8.272	8.368	7.111	7.549	7.564	7.564
Composition (% by mass)	C	0.064	0.048	0.047	0.040	0.045	0.046
	Si	0.462	0.624	0.536	0.404	0.526	0.393
	Mn	1.202	1.379	1.379	1.077	1.343	1.228
	P	0.011	0.007	0.007	0.007	0.007	0.007
	S	0.008	0.005	0.005	0.005	0.005	0.005
	Cu	0.011	0.010	0.010	0.010	0.010	0.010
	Ni	0.012	0.010	0.010	0.010	0.010	0.010
	Cr	2.482	1.445	1.278	1.158	1.280	1.214
	Mo	1.068	0.472	0.472	0.408	0.457	0.457
	Al	0.032	0.167	0.007	0.007	0.008	0.007
	Al_2O_3 (Equivalent Al content)	0.046	0.295	0.043	0.033	0.041	0.041
	Total	0.078	0.462	0.050	0.041	0.049	0.050
	Ti	0.072	0.068	0.068	0.001	0.286	0.066
	Nb	0.002	0.002	0.003	0.002	0.002	0.002
	Nb_2O_5 (Equivalent Nb content)	0.000	0.000	0.003	0.000	0.000	0.000
	Total	0.002	0.002	0.006	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001
	V_2O_3 (Equivalent V content)	0.004	0.003	0.007	0.003	0.003	0.003
	Total	0.005	0.004	0.008	0.004	0.004	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000
	B_2O_3 (Equivalent B content)	0.009	0.008	0.008	0.002	0.008	0.009
	Total	0.009	0.008	0.008	0.002	0.018	0.009
Slag-forming material	N	0.013	0.014	0.019	0.007	0.023	0.006
	Mg	0.849	0.751	0.751	0.234	0.728	0.728
	Zr	0.154	0.145	0.116	0.000	0.112	0.028
	TiO_2	7.133	6.889	7.135	6.494	6.674	6.674
	SiO_2	0.394	0.363	0.384	0.255	0.352	0.360
	Al_2O_3	0.086	0.568	0.080	0.063	0.078	0.078
	ZrO_2	0.168	0.000	0.000	0.000	0.000	0.000
	MgO	0.326	0.000	0.156	0.000	0.000	0.000
	V_2O_5	0.006	0.006	0.012	0.006	0.006	0.006
	Nb_2O_5	0.000	0.000	0.004	0.000	0.000	0.000
	Na_2O	0.050	0.049	0.047	0.021	0.046	0.049
	K_2O	0.039	0.037	0.037	0.028	0.036	0.036
	CaO	0.004	0.000	0.002	0.000	0.000	0.000
	B_2O_3	0.028	0.026	0.026	0.007	0.025	0.028
	NaF	0.160	0.000	0.000	0.000	0.000	0.000
	K_2SiF_6	0.135	0.286	0.286	0.233	0.277	0.277
	CeF_3	0.042	0.040	0.000	0.000	0.039	0.039
	CaF_2	0.033	0.000	0.156	0.000	0.000	0.000
	Total (Equivalent F content)	0.171	0.160	0.224	0.120	0.155	0.155
	Other elements	0.030	0.017	0.042	0.005	0.016	0.017
	Total Ti/N	328	291	233	539	184	679
							125

Table 9

Wire No.	Example 15	Example 16	Example 17	Example 18	Example 19	Example 20	Example 21
Sheath quality	B	A	B	B	B	B	B
Flux ratio (% by mass)	15.5	15.5	15.5	15.0	16.0	16.0	16.0
Slag-forming material content (% by mass)	7.649	7.502	7.146	8.730	7.512	8.592	6.256
Composition (% by mass)	C	0.040	0.060	0.044	0.043	0.046	0.046
	Si	0.556	0.388	0.354	0.342	0.396	0.365
	Mn	1.169	1.124	1.228	1.192	1.268	1.265
	P	0.007	0.011	0.007	0.007	0.007	0.007
	S	0.005	0.007	0.005	0.004	0.005	0.005
	Cu	0.010	0.011	0.010	0.010	0.010	0.010
	Ni	0.010	0.012	0.010	0.010	0.010	0.010
	Cr	1.351	1.362	1.280	1.239	1.396	1.321
	Mo	0.457	0.460	0.457	0.443	0.472	0.452
	Al	0.007	0.032	0.007	0.007	0.007	0.007
	Al ₂ O ₃ (Equivalent Al content)	0.041	0.041	0.047	0.032	0.043	0.042
	Total	0.048	0.073	0.054	0.039	0.050	0.049
	Ti	0.163	0.033	0.098	0.126	0.034	0.201
	Nb	0.002	0.002	0.002	0.002	0.002	0.002
	Nb ₂ O ₅ (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.001	0.001	0.001	0.001	0.001
	V ₂ O ₃ (Equivalent V content)	0.003	0.003	0.002	0.004	0.003	0.003
	Total	0.004	0.004	0.003	0.005	0.004	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000
	B ₂ O ₃ (Equivalent B content)	0.008	0.008	0.009	0.007	0.008	0.008
	Total	0.008	0.008	0.009	0.007	0.008	0.008
Slag-forming material	N	0.008	0.007	0.023	0.023	0.015	0.014
	Mg	0.232	1.487	0.728	0.704	0.751	0.761
	Zr	0.112	0.000	0.000	0.000	0.000	0.000
	TiO ₂	6.674	6.674	4.336	8.017	6.889	6.889
	SiO ₂	0.352	0.352	0.851	0.280	0.363	0.364
	Al ₂ O ₃	0.078	0.078	0.089	0.060	0.080	0.080
	ZrO ₂	0.000	0.000	0.936	0.000	0.000	0.000
	MgO	0.000	0.000	0.455	0.000	0.000	0.000
	V ₂ O ₅	0.006	0.006	0.004	0.007	0.006	0.005
	Nb ₂ O ₅	0.000	0.000	0.000	0.000	0.000	0.000
	Na ₂ O	0.046	0.046	0.052	0.041	0.047	0.047
	K ₂ O	0.036	0.036	0.041	0.027	0.037	0.037
	CaO	0.000	0.000	0.007	0.000	0.000	0.000
	B ₂ O ₃	0.026	0.025	0.028	0.024	0.026	0.026
	NaF	0.000	0.000	0.000	0.000	0.452	0.000
Fluoride compound	K ₂ SiF ₆	0.277	0.277	0.277	0.268	0.048	0.557
	CeF ₃	0.039	0.000	0.039	0.000	0.007	0.040
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000
	Total (Equivalent F content)	0.155	0.144	0.155	0.139	0.027	0.527
	Other elements	0.016	0.008	0.032	0.005	0.009	0.047
Total Ti/N		517	558	115	218	287	299
							135

Table 10

Wire No.	Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28	
Sheath quality	B	C	C	C	C	A	B	
Flux ratio (% by mass)	18.0	15.0	17.0	15.0	12.0	16.0	14.0	
Slag-forming material content (% by mass)	9.720	7.260	7.701	6.793	6.636	7.744	6.804	
Composition (% by mass)	C	0.054	0.049	0.051	0.048	0.043	0.068	0.043
	Si	0.410	0.563	0.434	0.493	0.453	0.368	0.447
	Mn	1.257	1.275	1.293	1.275	1.246	0.974	0.984
	P	0.007	0.004	0.004	0.004	0.003	0.012	0.007
	S	0.005	0.007	0.007	0.007	0.007	0.007	0.005
	Cu	0.009	0.011	0.011	0.011	0.011	0.011	0.010
	Ni	0.010	0.043	0.042	0.043	0.044	0.012	0.010
	Cr	1.483	1.269	1.253	1.341	1.293	1.522	2.250
	Mo	0.508	0.502	0.505	0.502	0.498	0.505	0.878
	Al	0.007	0.004	0.004	0.004	0.004	0.032	0.007
	Al_2O_3 (Equivalent Al content)	0.038	0.040	0.045	0.040	0.032	0.043	0.037
	Total	0.045	0.044	0.049	0.043	0.036	0.075	0.044
	Ti	0.114	0.002	0.144	0.127	0.002	0.001	0.001
	Nb	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Nb_2O_5 (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	V	0.001	0.003	0.002	0.003	0.003	0.001	0.001
	V_2O_3 (Equivalent V content)	0.004	0.003	0.003	0.003	0.003	0.003	0.003
	Total	0.005	0.006	0.005	0.006	0.006	0.004	0.004
	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	B_2O_3 (Equivalent B content)	0.009	0.007	0.008	0.007	0.006	0.008	0.008
	Total	0.009	0.007	0.008	0.007	0.006	0.008	0.008
Slag-forming material	N	0.027	0.018	0.019	0.027	0.016	0.023	0.019
	Mg	0.899	0.674	0.764	0.674	0.539	0.799	0.699
	Zr	0.000	0.081	0.000	0.027	0.000	0.000	0.000
	TiO_2	7.912	6.459	6.793	5.994	5.994	6.889	5.594
	SiO_2	0.624	0.341	0.386	0.341	0.273	0.363	0.374
	Al_2O_3	0.071	0.075	0.085	0.075	0.061	0.080	0.071
	ZrO_2	0.604	0.000	0.000	0.000	0.000	0.000	0.094
	MgO	0.000	0.000	0.000	0.000	0.000	0.000	0.133
	V_2O_5	0.007	0.006	0.006	0.005	0.005	0.006	0.005
	Nb_2O_5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Na_2O	0.050	0.044	0.050	0.044	0.036	0.047	0.046
	K_2O	0.033	0.035	0.039	0.035	0.028	0.037	0.030
	CaO	0.000	0.000	0.000	0.000	0.000	0.000	0.002
	B_2O_3	0.029	0.024	0.027	0.024	0.019	0.026	0.025
	NaF	0.000	0.000	0.000	0.000	0.000	0.000	0.013
	K_2SiF_6	0.322	0.268	0.304	0.268	0.215	0.286	0.250
	CeF ₃	0.045	0.000	0.000	0.000	0.000	0.000	0.116
	CaF ₂	0.000	0.000	0.000	0.000	0.000	0.000	0.014
	Total (Equivalent F content)	0.180	0.139	0.157	0.139	0.111	0.148	0.176
	Other elements	0.024	0.008	0.010	0.008	0.006	0.009	0.035
	Total Ti/N	183	215	218	138	225	178	172

Table 11

Wire No.	Example 29	Example 30	Example 31	Example 32	Example 33	Example 34	Example 35
Sheath quality	B	B	B	D	D	B	B
Flux ratio (% by mass)	15.0	15.0	15.5	16.0	14.0	13.0	15.0
Slag-forming material content (% by mass)	7.290	7.245	7.487	7.216	6.314	7.215	8.325
Composition (% by mass)							
C	0.051	0.059	0.062	0.055	0.052	0.044	0.050
Si	0.663	0.461	0.518	0.463	0.465	0.471	0.606
Mn	1.037	1.035	1.062	1.251	1.232	1.236	1.240
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.005	0.005	0.005	0.005	0.005	0.004	0.004
Cu	0.010	0.010	0.009	0.012	0.012	0.010	0.010
Ni	0.010	0.010	0.010	0.026	0.027	0.010	0.010
Cr	2.338	2.338	2.416	2.134	2.173	1.178	1.282
Mo	0.940	0.940	0.972	0.994	1.007	0.400	0.462
Al	0.007	0.007	0.007	0.002	0.002	0.007	0.007
Al_2O_3 (Equivalent Al content)	0.040	0.039	0.041	0.042	0.036	0.035	0.041
Total	0.047	0.046	0.048	0.044	0.038	0.042	0.048
Ti	0.001	0.126	0.130	0.135	0.001	0.001	0.126
Nb	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Nb_2O_5 (Equivalent Nb content)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.002	0.002	0.002	0.002	0.002	0.002	0.002
V	0.001	0.001	0.001	0.003	0.003	0.001	0.001
V_2O_3 (Equivalent V content)	0.003	0.003	0.003	0.003	0.003	0.003	0.004
Total	0.004	0.004	0.004	0.006	0.006	0.004	0.005
B	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B_2O_3 (Equivalent B content)	0.008	0.006	0.006	0.006	0.005	0.008	0.009
Total	0.008	0.006	0.006	0.006	0.005	0.008	0.009
N	0.021	0.021	0.021	0.018	0.017	0.010	0.010
Mg	0.749	0.749	0.774	0.799	0.699	1.273	0.749
Zr	0.136	0.000	0.028	0.029	0.025	0.094	0.163
TiO_2	5.994	5.994	6.194	6.394	5.594	6.494	7.493
SiO_2	0.401	0.378	0.390	0.347	0.304	0.309	0.357
Al_2O_3	0.076	0.074	0.077	0.079	0.069	0.066	0.077
ZrO_2	0.101	0.101	0.104	0.000	0.000	0.000	0.000
MgO	0.143	0.143	0.148	0.000	0.000	0.000	0.000
V_2O_5	0.005	0.005	0.006	0.006	0.005	0.006	0.007
Nb_2O_5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na_2O	0.050	0.040	0.041	0.042	0.037	0.044	0.051
K_2O	0.032	0.031	0.032	0.033	0.029	0.030	0.035
CaO	0.002	0.002	0.002	0.000	0.000	0.000	0.000
B_2O_3	0.027	0.019	0.020	0.020	0.017	0.025	0.029
Slag-forming material							
Fluoride compound							
NaF	0.014	0.014	0.015	0.000	0.000	0.000	0.000
K_2SiF_6	0.268	0.268	0.277	0.286	0.250	0.233	0.268
CeF_3	0.125	0.125	0.129	0.000	0.000	0.000	0.000
CaF_2	0.015	0.015	0.015	0.000	0.000	0.000	0.000
Total (Equivalent F content)	0.188	0.188	0.195	0.148	0.130	0.120	0.139
Other elements	0.038	0.037	0.038	0.009	0.008	0.007	0.008
Total Ti/N	174	180	181	215	194	400	450

Table 12

Welding current (A) (DCEP)	Arc voltage (V)	Welding speed (cm/min)	Welding position	Shielding gas flow rate (l/min)	Preheating and interpass temperature (°C)	Remarks
270	27 - 32	25 - 30	Flat position	Refer to tables for composition, Flow rate: 25	176 ± 15	2.25 Cr-1 Mo alloys 1.25 Cr-0.5 Mo alloys 0.5 Mo alloys

Table 13

Welding current (A) (DCEP)	Arc voltage (V)	Welding speed (cm/min)	Welding position	Shielding gas flow rate (l/min)	Preheating and interpass temperature (°C)	Remarks
180	22 - 26	20 - 30	Vertical position	Refer to tables for composition, Flow rate: 25	176 ± 15	2.25 Cr-1 Mo alloys 1.25 Cr-0.5 Mo alloys 0.5 Mo alloys

Table 14

Flux-cored wires	Conditions for acceptable tensile property			Conditions for acceptable impact performance 2 mmV/E-18°C
	0.2%-Offset yield strength	Tensile strength	Elongation	
Comparative example 1 - 5, 7, 9 - 29	Min. 470 Mpa	560 - 690 Mpa	Min. 19%	
Example 1 - 5, 9 - 27, 34, 35				
Comparative example 6, 8	Min. 540 Mpa	620 - 760 Mpa	Min. 17%	55 J or above
Example 6, 8, 28 - 33				
Example 7	Min. 400 Mpa	480 - 620 Mpa	Min. 20%	

Example 7: 620°C × 1 hr, Furnace cooling
 Others: 690°C × 1 hr, Furnace cooling

Table 15

Flux-coated wire	Comparative example 1	Comparative example 2	Comparative example 3	Comparative example 4	Comparative example 5	Comparative example 6	Comparative example 7	Comparative example 8
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.209	0.048	0.049	0.045	0.066	0.051	0.050	0.045
Si	0.73	0.06	1.56	0.58	0.62	0.68	0.65	0.47
Mn	1.06	1.01	1.02	0.39	1.17	1.00	1.00	0.99
P	0.007	0.007	0.008	0.007	0.007	0.007	0.007	0.007
S	0.009	0.010	0.009	0.009	0.009	0.009	0.009	0.010
Cu	0.015	0.015	0.015	0.015	0.015	0.014	0.015	0.014
Chemical composition (% by mass)	Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015
	Cr	1.48	1.28	1.28	1.21	1.21	2.56	1.35
	Mo	0.56	0.56	0.56	0.46	0.46	1.06	0.32
	Al	0.002	0.002	0.003	0.002	0.002	0.002	0.002
	Ti	0.101	0.048	0.215	0.039	0.155	0.098	0.094
	Nb	0.002	0.002	0.002	0.003	0.003	0.002	0.002
	V	0.009	0.009	0.009	0.007	0.007	0.007	0.007
	B	0.0049	0.0005	0.0049	0.0006	0.0040	0.0046	0.0041
	N	0.012	0.013	0.013	0.011	0.011	0.013	0.013
Usability,	Good	Bad	Good	Good	Bad	Good	Good	Good
Radiographic examination	JIS Class 1 or below (HC)	JIS Class 1 or below (BH)						
Test results	Tensile strength (MPa)	732	572	728	541	740	775	545
	0.2%-Offset yield strength (MPa)	602	475	612	445	642	583	444
	Elongation (%)	21	24	20	28	18	19	22
	2 mmVE-18°C (Avg. J)	33	14	13	19	22	21	53
	Ferrite band suppression	Acceptable	Unacceptable	Acceptable	Unacceptable	Acceptable	Acceptable	Acceptable

*HC: Hot cracking, BH: Blow holes

Table 16

Flux-coated wire		Comparative example 9	Comparative example 10	Comparative example 11	Comparative example 12	Comparative example 13	Comparative example 14	Comparative example 15
Designation of material of plates	A387 Gr.11 C1.2							
Shielding gas	80%Ar+20%CO ₂							
C	0.055	0.062	0.053	0.053	0.053	0.053	0.052	0.047
Si	0.74	0.51	0.42	0.42	0.42	0.42	0.42	0.36
Mn	0.72	1.12	0.95	0.95	0.95	0.94	0.94	0.37
P	0.007	0.007	0.007	0.008	0.007	0.008	0.008	0.007
S	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.009
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.52	1.58	1.29	1.30	1.29	1.29	1.29	1.11
Mo	0.63	0.60	0.49	0.49	0.49	0.49	0.49	0.42
Al	0.022	0.022	0.002	0.002	0.002	0.002	0.002	0.002
Ti	0.169	0.204	0.081	0.069	0.081	0.074	0.088	
Nb	0.002	0.002	0.019	0.018	0.003	0.013	0.003	
V	0.007	0.008	0.010	0.022	0.031	0.026	0.007	
B	0.0052	0.0052	0.0043	0.0043	0.0043	0.0043	0.0000	
N	0.014	0.014	0.012	0.012	0.012	0.012	0.008	
Usability,	Good							
Radiographic examination*	JIS class 1							
Tensile strength (MPa)	694	703	675	683	654	664	646	
Test results 0.2%-Offset yield strength (MPa)	597	599	590	595	565	559	558	
Elongation (%)	25	23	24	24	23	23	25	
2 mm/V-E-18°C (Avg. J)	5	7	11	13	21	25	9	
Ferrite band suppression	Acceptable							

Table 17

Flux-coated wire		Comparative example 16	Comparative example 17	Comparative example 18	Comparative example 19	Comparative example 20	Comparative example 21	Comparative example 22
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2					
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂					
C	0.047	0.047	0.047	0.048	0.053	0.054	0.050	0.050
Si	0.36	0.36	0.35	0.40	0.42	0.43	0.39	0.39
Mn	0.87	0.87	0.85	0.84	0.77	0.79	0.90	0.90
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.11	1.11	1.06	1.32	1.30	1.34	1.23	1.23
Mo	0.43	0.42	0.42	0.42	0.49	0.51	0.46	0.46
Al	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.013
Ti	0.059	0.088	0.088	0.088	0.042	0.151	0.040	0.040
Nb	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002
V	0.007	0.007	0.007	0.007	0.007	0.007	0.005	0.005
B	0.0124	0.0132	0.0037	0.0037	0.0009	0.0045	0.0045	0.0045
N	0.009	0.008	0.003	0.032	0.012	0.011	0.013	0.013
Usability,	Good	Good	Good	Bad	Good	Bad	Bad	Bad
Radiographic examination*	JIS Class 1 or below (HC)	JIS Class 1 or below (HC)	JIS Class 1 or below (BH)	JIS class 1	JIS class 1			
Tensile strength (MPa)	674	675	563	649	652	663	673	673
0.2%-Offset yield strength (MPa)	569	558	567	538	559	561	569	569
Elongation (%)	25	24	25	22	25	25	25	25
2 mm/E-18°C (Avg. J)	67	57	33	15	11	32	59	59
Ferrite band suppression	Acceptable	Acceptable	Unacceptable	Acceptable	Unacceptable	Acceptable	Unacceptable	Unacceptable

*HC: Hot cracking, BH: Blow holes

Table 18

Flux-coated wire	Comparative example 23	Comparative example 24	Comparative example 25	Comparative example 26	Comparative example 27	Comparative example 28	Comparative example 29
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.042	0.048	0.056	0.057	0.050	0.057	0.049
Si	0.41	0.36	0.44	0.05	0.39	0.36	0.38
Mn	0.91	0.85	0.93	0.37	0.82	0.76	0.93
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.009	0.009	0.009	0.010	0.009	0.009	0.009
Cu	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	1.32	1.13	1.36	1.33	1.22	1.12	1.25
Mo	0.47	0.43	0.53	0.53	0.46	0.60	0.46
Al	0.002	0.002	0.002	0.002	0.006	0.022	0.002
Ti	0.116	0.046	0.100	0.045	0.048	0.204	0.096
Nb	0.003	0.003	0.003	0.002	0.002	0.002	0.003
V	0.009	0.009	0.009	0.007	0.005	0.008	0.009
B	0.0045	0.0009	0.0041	0.0009	0.0044	0.0047	0.0135
N	0.012	0.011	0.013	0.012	0.013	0.034	0.033
Usability,	Good	Bad	Bad	Bad	Bad	Bad	Bad
Radiographic examination*	JIS Class 1 or below (SI)	JIS Class 1 or below (BH)	JIS class 1	JIS Class 1 or below (BH)	JIS Class 1	JIS Class 1 or below (BH)	JIS Class 1 or below (BH, HC)
Test results	Tensile strength (MPa)	679	654	665	532	573	712
	0.2%-Offset yield strength (MPa)	585	560	573	445	485	625
	Elongation (%)	26	26	25	23	25	18
	2 mm/E-18°C (Avg. J)	38	13	65	13	69	18
	Ferrite band suppression	Acceptable	Unacceptable	Acceptable	Unacceptable	Unacceptable	Acceptable

HC: Hot cracking BH: Blow holes SI: Slug inclusion

Table 19

Flux-cored wire		Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A204 Gr. A
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	100%CO ₂	100%CO ₂	100%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂
C	0.147	0.043	0.044	0.054	0.053	0.042	0.042	0.043
Si	0.53	0.08	0.73	0.37	0.24	0.39	0.41	
Mn	0.46	0.88	0.57	0.41	1.12	0.73	0.78	
P	0.012	0.007	0.007	0.007	0.007	0.007	0.007	
S	0.013	0.010	0.009	0.010	0.010	0.010	0.009	
Cu	0.018	0.015	0.015	0.015	0.015	0.015	0.015	
Ni	0.018	0.015	0.015	0.015	0.015	0.015	0.015	
Cr	1.08	1.24	1.19	1.44	1.44	2.40	0.11	
Mo	0.42	0.49	0.48	0.58	0.58	1.07	0.52	
Al	0.003	0.002	0.003	0.002	0.002	0.002	0.002	
Ti	0.088	0.088	0.078	0.099	0.099	0.074	0.080	
Nb	0.003	0.003	0.002	0.002	0.002	0.003	0.003	
V	0.007	0.007	0.006	0.008	0.008	0.006	0.007	
B	0.0043	0.0043	0.0043	0.0052	0.0052	0.0039	0.0042	
N	0.011	0.011	0.011	0.013	0.013	0.010	0.013	
Usability,	Good	Good	Good	Good	Good	Good	Good	
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	
Tensile strength (MPa)	682	673	685	685	683	696	579	
Test results	0.2%-Offset yield strength (MPa)	595	595	594	598	589	602	483
Elongation (%)	20	25	22	25	24	25	26	
2 mm/E-18°C (Avg. J)	120	109	110	108	125	121	82	
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	

Table 20

Flux-coated wire		Example 8	Example 9	Example 10	Example 11	Example 12	Example 13	Example 14
Designation of material of plates	A387 Gr. 22 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	100%CO ₂	80%Ar+20%CO ₂	100%CO ₂	80%Ar+20%CO ₂				
C	0.077	0.059	0.057	0.048	0.055	0.054	0.055	0.055
Si	0.40	0.69	0.47	0.44	0.58	0.43	0.58	0.58
Mn	0.86	1.01	0.98	0.73	0.98	0.89	0.89	0.89
P	0.012	0.007	0.007	0.007	0.007	0.007	0.007	0.007
S	0.015	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Cu	0.017	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Ni	0.018	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Cr	2.31	1.40	1.19	1.11	1.23	1.17	1.30	1.30
Mo	1.17	0.53	0.52	0.45	0.51	0.51	0.51	0.51
Al	0.003	0.020	0.002	0.002	0.002	0.002	0.002	0.002
Ti	0.095	0.114	0.095	0.083	0.115	0.110	0.110	0.110
Nb	0.002	0.003	0.007	0.003	0.002	0.002	0.002	0.002
V	0.008	0.007	0.013	0.007	0.007	0.007	0.007	0.007
B	0.0051	0.0045	0.0045	0.0014	0.0014	0.0050	0.0050	0.0050
N	0.012	0.013	0.016	0.006	0.020	0.005	0.028	0.028
Usability,	Good	Good	Good	Good	Good	Good	Good	Good
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1
Tensile strength (MPa)	716	673	663	661	681	653	679	679
Test results	0.2%-Offset yield strength (MPa)	623	591	572	562	578	562	567
Elongation (%)	25	25	25	27	24	27	27	23
2 mm/E-18°C (Avg. J)	118	108	92	62	75	89	76	76
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 21

Flux-coated wire		Example 15	Example 16	Example 17	Example 18	Example 19	Example 20	Example 21
Designation of material or plates		A387 Gr.11 C1.2						
Shielding gas		80%Ar+20%CO ₂						
C	0.049	0.073	0.053	0.052	0.055	0.056	0.058	
Si	0.61	0.43	0.39	0.38	0.43	0.44	0.40	
Mn	0.85	0.82	0.89	0.88	0.92	0.93	0.82	
P	0.007	0.012	0.008	0.007	0.007	0.007	0.007	
S	0.009	0.013	0.010	0.009	0.009	0.009	0.009	
Cu	0.015	0.017	0.015	0.015	0.015	0.015	0.015	
Ni	0.015	0.017	0.015	0.015	0.015	0.015	0.015	
Cr	1.30	1.30	1.23	1.21	1.34	1.36	1.25	
Mo	0.51	0.51	0.51	0.50	0.52	0.53	0.50	
Al	0.002	0.003	0.002	0.002	0.002	0.002	0.002	
Ti	0.113	0.109	0.073	0.135	0.113	0.118	0.087	
Nb	0.002	0.002	0.002	0.003	0.002	0.003	0.002	
V	0.007	0.007	0.005	0.008	0.007	0.007	0.005	
B	0.0045	0.0045	0.0050	0.0044	0.0046	0.0047	0.0045	
N	0.007	0.006	0.020	0.020	0.013	0.013	0.021	
Usability,	Good	Good	Good	Good	Good	Good	Good	
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	
Tensile strength (MPa)	649	665	647	673	660	673	662	
Test results	0.2%-Offset yield strength (MPa)	538	561	552	569	553	561	565
	Elongation (%)	28	26	24	22	24	25	24
	2 mm/E-18°C (Avg. J.)	95	88	84	76	113	115	82
	Ferrite band suppression	Acceptable						

Table 22

Flux-coated wire		Example 22	Example 23	Example 24	Example 25	Example 26	Example 27	Example 28
Designation of material of plates	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2	A387 Gr.11 C1.2
Shielding gas	80%Ar+20%CO ₂	98%Ar+20%CO ₂	80%Ar+20%CO ₂					
C	0.067	0.059	0.061	0.058	0.051	0.082	0.051	0.051
Si	0.46	0.63	0.48	0.54	0.49	0.41	0.49	0.49
Mn	0.94	1.10	0.94	0.92	0.90	0.71	0.71	0.71
P	0.008	0.004	0.004	0.004	0.004	0.012	0.007	0.007
S	0.009	0.014	0.014	0.014	0.013	0.013	0.009	0.009
Cu	0.015	0.017	0.017	0.017	0.017	0.017	0.015	0.015
Ni	0.015	0.063	0.061	0.062	0.064	0.017	0.015	0.015
Cr	1.46	1.30	1.21	1.28	1.23	1.47	2.15	2.15
Mo	0.58	0.56	0.56	0.55	0.55	0.56	0.97	0.97
Al	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002
Ti	0.135	0.104	0.114	0.100	0.081	0.094	0.076	0.076
Nb	0.003	0.003	0.002	0.002	0.003	0.002	0.002	0.002
V	0.008	0.010	0.009	0.009	0.010	0.007	0.006	0.006
B	0.0053	0.0043	0.0049	0.0043	0.0034	0.0046	0.0045	0.0045
N	0.024	0.016	0.017	0.023	0.014	0.020	0.017	0.017
Usability,	Good	Good	Good	Good	Good	Good	Good	Good
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1
Tensile strength (MPa)	672	659	662	667	672	680	721	721
Test results	0.2%-Offset yield strength (MPa)	574	549	553	559	562	579	630
Elongation (%)	23	24	25	24	26	24	26	26
2 mm/E-18°C (Avg. J)	78	79	88	81	65	68	63	63
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 23

Flux-cored wire	Example 29	Example 30	Example 31	Example 32	Example 33	Example 34	Example 35	
Designation of material of plates	A387 Gr.22 C1.2	A387 Gr.22 C1.2	A387 Gr.22 C1.2	A387 Gr.22 C1.2	A387 Gr.22 C1.2	A387 Gr.22 C1.2	A387 Gr.22 C1.2	
Shielding gas	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	80%Ar+20%CO ₂	
C	0.073	0.071	0.074	0.066	0.061	0.053	0.061	
Si	0.73	0.50	0.57	0.51	0.50	0.51	0.67	
Mn	0.75	0.75	0.77	0.91	0.88	0.90	0.91	
P	0.007	0.007	0.007	0.007	0.007	0.007	0.007	
S	0.009	0.010	0.010	0.010	0.010	0.009	0.009	
Cu	0.015	0.015	0.015	0.018	0.018	0.015	0.015	
Ni	0.015	0.015	0.015	0.038	0.039	0.015	0.015	
Cr	2.24	2.24	2.32	2.05	2.06	1.13	1.24	
Mo	1.04	1.04	1.08	1.10	1.10	0.44	0.52	
Al	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Ti	0.082	0.100	0.104	0.107	0.075	0.088	0.106	
Nb	0.002	0.002	0.002	0.002	0.002	0.003	0.003	
V	0.007	0.007	0.007	0.010	0.011	0.007	0.008	
B	0.0049	0.0034	0.0036	0.0036	0.0031	0.0046	0.0053	
N	0.018	0.018	0.019	0.016	0.015	0.008	0.009	
Usability,	Good	Good	Good	Good	Good	Good	Good	
Radiographic examination	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	JIS class 1	
Tensile strength (MPa)	732	742	748	746	732	675	678	
Test results	0.2%-Offset yield strength (MPa)	641	651	653	655	631	573	569
Elongation (%)	26	26	25	25	25	24	25	25
2 mmVE-18°C (Avg. J)	81	83	89	89	81	132	110	110
Ferrite band suppression	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable